Marine Physical Laboratory

Postgraduate Support for Acoustics and Signal Processing in Waveguides Bounded by Inhomogeneous Biot Type Sediments

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June 1, 1994 - November 30, 1995

Abstract

A range-dependent model incorporating the Biot theory of acoustic propagation in a fluid-filled porous media was implemented and used to investigate the optimum frequency of propagation in shallow water waveguides at high frequency.

Research Objectives

The objective of this effort was to implement a range-dependent model incorporating the Biot theory of acoustic propagation in a fluid-filled porous media and then use this model to investigate issues related to high frequency propagation in shallow water waveguides.

Research Summary

Biot developed a theory for acoustic propagation in fluid-filled porous media which predicts the existence of two compressional acoustic waves. The faster wave corresponds to the compressional wave propagating

through a solid medium and the slower wave rapidly attenuates. Collins at the Naval Research Laboratory extended the parabolic equation (PE) method to handle problems involving poro-elastic layers [1]. This code was used to investigate the optimum frequency of propagation in very shallow water waveguides at high frequency (e.g. coastal shallow water regions). The results of this research are reported in [2].

References

M.D. Collins, W.A. Kuperman, and W.L. Siegmann, "A parabolic equation for poro-elastic media," J. Acoust. Soc. Am. 98: 1645-1656 (1995).

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